California Energy Commission

Emerging Energy Technologies

Thermal Heat Pumps (THP)

This new high efficiency thermally driven heat pump can produce hot water at 140^{o} F and cold water at 40^{o} F. The unit operates on the ammonia absorption cycle and incorporates internal regenerative heat exchangers achieving higher energy efficiencies. Monitored operation of the new heat pump at a poultry processing plant demonstrated up to 68% savings in electrical energy and 27% savings in thermal energy compared to the conventional practice.

Energy Savings:
48,600 therms and 272,000 kWh per year for a 100 ton unit operating 4,000 hours

Benefit:
More than $75,800 in energy savings per year

Contact:
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www.energy-concepts.com

Electrodialysis Membrane Systems

Electrodialysis is an electrically driven membrane process that separates ionized solutes from aqueous solutions. The process promotes tartrate stabilization in wines preventing tartrates from precipitating during storage. Cold storage involves cooling wine to about 28^{o} F holding it in insulated tanks for periods of several days to weeks. The energy consumption of cold stabilization process is conservatively estimated at about 70 kilowatt-hours (kWh) per 1,000 gallons (kgal). Electrodialysis uses about 12 kWh per kgal of wine

Energy Savings:
139,200 kWh per year for a 600 gal/hour unit operating 4,000 hours

Benefit:
More than $13,200 in energy savings per year

Contact:
Eric Dahlberg, President
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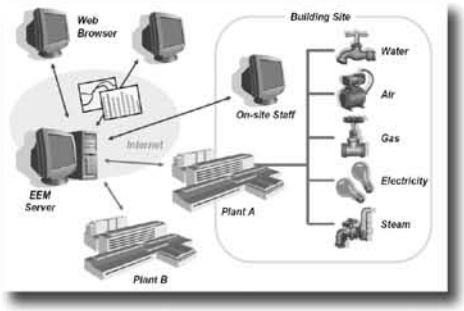
Enterprise Energy Management (EEM) Systems

Enterprise Energy Management Systems integrate the use of software, data acquisition hardware, and communication systems to collect, analyze and display information from energy assets and other process equipment. Managers can make optimization decisions to reduce energy use that translate into cost savings. EEM systems track key energy management functions such as organizing energy use data, identifying energy consumption anomalies, managing energy costs, and automating demand response strategies.



Energy Savings:
Are site specific.

Benefits:
Optimize performance, reduce waste, lower CO2 emissions, lower cost of production

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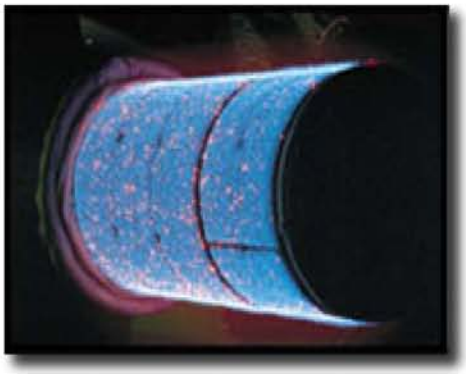
Emerging Energy Technologies

Low NOX Controlled Energy Efficient Boilers

Cooling the flame by adding excess ambient air (EA) and flue gas recirculation (FGR) are the two methods to achieve ultra low NOX emissions from boilers. FGR is preferred due to high thermal efficiency while EA uses less electrical energy. A new hybrid EA-FGR control technology combines the best features of the two approaches. Overall energy costs are lower compared to either strict EA or FGR only operation.



Energy Savings:
36,120 kWh for a 600 hp boiler operating 800 hours. Although, thermal energy increased by 160 million Btu, net energy savings was 210 million Btu equivalents.

Benefit:
$2,700 in energy savings per year

Contact:
Alzeta Corporation
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Integrated Heating and Cooling Topping Cycle

This new integrated heating and cooling topping cycle concept is an optimal strategy to reduce electrical power consumption. It involves a high-pressure steam turbine driven refrigeration system for cooling and low-pressure exhaust steam for heating. The pilot installation reduced electrical power consumption by 104 kW during the peak season and 46 kW during the off-peak season.

Energy Savings:
540,000 kWh per year for a 86 hp steam turbine coupled to a chiller

Benefit:
More than $45,000 in energy savings per year

Contact:
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Hudson Technologies Company
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Solar Thermal Systems

Parabolic-trough collectors use mirrored surfaces curved in a linearly extended parabolic shape to focus sunlight on a dark surfaced absorber tube running the length of the trough. A heat transfer fluid is pumped through the absorber tube to pick up the solar heat. Parabolic-trough systems use single-axis tracking systems to keep them facing the sun.

Energy Production:
200,000 to 350,000 Btu per square foot per year

Benefits:
Substitute's renewable energy for electricity or fossil-fuels, lower NOx and CO2 emissions.

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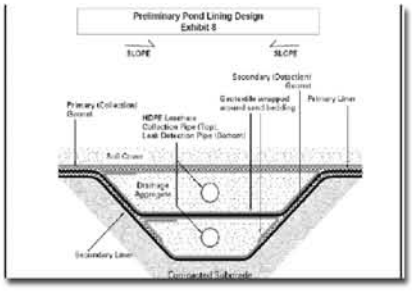
California Energy Commission

Emerging Energy Technologies

Agricultural and Food Waste for Biopower and Biofuel Generation

The Anaerobic Digester Project is an economically feasible solution to energy and waste issues facing food processors by collecting and utilizing anaerobic digester biogas to economically produce electricity and heat. Biogas is collected by anaerobic digestion of organic wastes to fuel a micro turbine equipped with a heat exchanger. Thus, the waste heat captured is used to supplement the facility's heat requirement and it can be used to heat the digester influent.



Energy Production:
20,000-25,000 Therms/year

Benefits:
Reduced waste disposal costs, capture of methane greenhouse gases, improved waste management practices

Contact:
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If you would like to discuss project and facility eligibility, funding availability, and application requirements, please contact:

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